California Public Employees' Retirement System
State and Schools Pension Plans
Parallel Valuation and Certification

Report Completed In Satisfaction of
Task 2 of Contract 2009-5377

Approved:

Robert T. McCrory, FSA
Principal Actuary

Approved:

Gregory M. Stump, FSA
Supporting Actuary

November 23, 2010

EFI ACTUARIES | EFI ASSET/LIABILITY MANAGEMENT SERVICES, INC.

The nation's leader in plan-specific, interactive asset allocation optimization counseling

WASHINGTON, DC ¤ PHILADELPHIA ¤ SEATTLE ¤ SAN FRANCISCO

Contents

Background and Purpose

Under Task 2 of Contract 2009-5377 (the Contract), EFI Actuaries is charged with preparing a parallel valuation and certification (the Report) of the June 30, 2009 actuarial valuations of the CalPERS State and Schools Pension Plans (the Plans).

This Report presents the methodology and results of the parallel valuations conducted by EFI. Special areas of investigation that were pursued by EFI are also described in the body of this Report. Comparisons of actuarial calculations and member data for each Plan are shown within the tables in the body and appendices of the Report.

Principal Results

Based on our parallel valuations of the State Plans and the County Schools Pool, EFI Actuaries certifies that the actuarial present values, accrued liabilities, normal costs, and employer contributions computed by the CalPERS Actuarial Office are accurate within professional tolerances and were calculated in accordance with generally accepted actuarial principles.

Table 1 below, shows a high level summary of our comparisons, with a comparison of the total Fiscal Year 2011 contribution in dollars. More detailed tables with individual plan information are shown below.

Table 1: Comparison of Employer Cost[1] ($ millions)

Plan	PERS Total Contribution for Fiscal Year 2011	EFI Total Contribution for Fiscal Year 2011	Relative Difference
State	$ 3,882	$ 3,951	1.8%
County Schools Pool	1,189	1,220	2.6%
Total	**$5,071**	**$5,171**	**2.0%**

[1] Does not include contributions for GTLI benefits

In general, we found that the liability and cost computations continue to be prepared by CalPERS' staff in a systematic, careful and thorough manner. Further areas of investigation that we pursued in more depth are outlined below.

Review of the 2009 Actuarial Valuations of the State and Schools

Under Task 2 of Contract 2009-5377, EFI Actuaries conducted parallel actuarial valuations as of June 30, 2009 of the State and Schools Pension Plans of the California Public Employees' Retirement System (CalPERS). The purpose of these valuations was to validate independently the actuarial valuations of these plans performed by CalPERS' staff actuaries.

As a result of our efforts, we are able to certify that the liabilities and costs computed by the staff as of June 30, 2009 are reasonably accurate and were computed in accordance with generally accepted actuarial principles. Based on the data, assumptions, and methods employed in the staff valuations, the employer contribution rates independently computed by EFI were within 5% of those in the staff valuations for each plan. The total FY 2011 contribution determined by EFI was within 2.0% of the amount computed in the staff valuations.

Additionally, the liabilities (fully projected basis as well as accrued basis) computed by EFI were within 3% of those in the staff valuations for all of the plans, and within ½% for the combined State plans, as well as the County Schools Pool.

Methodology

In order to verify the correctness of calculations in the State & Schools valuations, EFI conducted independent, parallel valuations using its own actuarial models. These independent valuations determine whether actuarial assumptions and methods as described in the CalPERS staff valuation reports are applied properly and yield the reported results.

In preparing our parallel valuations, we relied on member and asset data supplied by CalPERS staff. This data was neither audited nor independently verified. Parallel valuations were conducted for all plans.

We also examined various "log files" and test life files that were provided by Staff. The log files show all tabular valuation inputs as well as factors used in computation of present values and costs.

We compared the results of "test life" computations performed by CalPERS staff with those performed by EFI. A test life is a single member record that is analyzed in detail by an actuarial modeling system. By studying the output of such test life calculations, the accuracy of the actuarial software can be verified.

Valuation Comparisons

Tables 2 through 5 below show the liabilities, total normal cost rates, and employer contribution rates computed separately by CalPERS staff and by EFI for each of the State and Schools plans.

Table 2: Comparison of Present Value of Future Benefits ($ millions)

Plan	PVFB as Computed by PERS	PVFB as Computed by EFI	Relative Difference
State Miscellaneous	85,804	86,108	0.4%
State Industrial	3,292	3,203	(2.7%)
State Safety*	9,111	9,102	(0.1%)
State Peace Officers & Firefighters*	34,245	34,310	0.2%
California Highway Patrol	8,902	8,979	0.9%
Total State	**141,354**	**141,702**	**0.2%**
County Schools Pool	**63,761**	**64,089**	**0.5%**

* Reflects liability transfer of $356 million to the State POFF from the State Safety Plan

Table 3: Comparison of Accrued Liabilities ($ millions)

Plan	Accrued Liability as Computed by PERS	Accrued Liability as Computed by EFI	Relative Difference
State Miscellaneous	74,763	74,615	(0.2%)
State Industrial	2,467	2,480	0.5%
State Safety*	6,006	6,084	1.3%
State Peace Officers & Firefighters*	26,291	26,329	0.1%
California Highway Patrol	7,300	7,402	1.4%
Total State	**116,827**	**116,910**	**0.1%**
County Schools Pool	**52,493**	**52,744**	**0.5%**

* Reflects liability transfer of $356 million to the State POFF from the State Safety Plan

Table 4: Comparison of Total Normal Cost Rates (% of payroll)

Plan	Normal Cost Rate as Computed by PERS	Normal Cost Rate as Computed by EFI	Relative Difference
State Miscellaneous Tier 1	14.40%	15.12%	5.0%
State Miscellaneous Tier 2	9.56%	9.62%	0.6%
State Industrial	17.71%	17.41%	(1.7%)
State Safety	22.10%	21.72%	(1.7%)
State Peace Officers & Firefighters	25.39%	25.36%	(0.1%)
California Highway Patrol	22.54%	22.43%	(0.5%)
Total State	**17.92%**	**18.27%**	**2.0%**
County Schools Pool	**14.17%**	**14.37%**	**1.4%**

Table 5: Comparison of Employer Contribution Rates[1] (% of payroll)

Plan	Contribution Rate as Computed by PERS	Contribution Rate as Computed by EFI	Relative Difference
State Miscellaneous Tier 1	19.92%	20.62%	3.5%
State Miscellaneous Tier 2	19.62%	19.62%	0.0%
State Industrial	18.01%	17.59%	(2.3%)
State Safety	20.55%	20.42%	(0.6%)
State Peace Officers & Firefighters	28.81%	29.04%	0.8%
California Highway Patrol	32.63%	33.46%	2.5%
Total State	**22.29%**	**22.76%**	**2.1%**
County Schools Pool	**10.71%**	**11.11%**	**3.7%**

[1] Does not include rate for GTLI benefits

As shown in the tables above, the accrued liability and total normal cost calculations determined by EFI are within 5% of those determined by PERS in all cases, and within a much smaller margin in most cases. The total contribution based on EFI calculations for all plans combined is $5.71 billion, which is within 2.0% of the amount of $5.071 billion shown in the valuation report.

In performing a parallel valuation, it is important to note that the employer contribution rate is very sensitive to small changes in plan liabilities. For a funded plan, a small difference in accrued liability will result in a much larger difference in the unfunded accrued liability. Add to this the presence of employee contributions, and small liability differences translate to large impacts on the total contribution rate. For example, even though the accrued liability and total normal cost computed by EFI for the California Highway Patrol Plan were within 1.4% and 0.5% respectively of those determined in the staff valuations, the total cost computed by EFI was more 2.5% higher.

As indicated in prior audit reports, this issue will always have the potential to distort total cost results. For this reason, during the audit we focus principally on the comparison of normal cost and liabilities, as well as comparisons of data and other present value calculations (see Appendices 1 and 2).

As indicated above, there were several areas of in-depth investigation that EFI undertook. These are outlined below.

Handling of Death and Refund Decrements

Upon examination of test life output files provided by CalPERS Staff, we noticed that the pre-retirement mortality decrements were not in line with the reported mortality assumptions. Through discussions with staff members, we found that there are adjustments made to these decrements for the valuations. The adjustments deal with the percent of members assumed to be married.

For example, for the State Industrial Plan, this assumption is 85%. This factor is applied to the pre-retirement mortality decrement and the remaining 15% (100% - 85%) is applied to the refund decrement.

We found this method to be appropriate and reasonable, and we were able to match the calculations in the test files. This approach properly reflects the survivorship assumptions, and it provides a reliable projection of benefit payments that is in line with the administration of the plan in the case of deaths among active members.

Part Time Schools Employees

The Schools population is unique in that many of the active plan participants are part-time employees. These members are subject to special handling for the purpose of the valuation.

Upon a review of test lives provided by CalPERS Staff, our understanding is that the following procedures apply to these members:

- Benefit service is assumed to continue to accrue at the part-time rate.
- Eligibility service is assumed to continue to accrue at the full-time rate.
- Decrements and assumed salary increases are based on eligibility service.

We were able to verify that these methods were applied properly. At face value, the handling of decrements and salary increases is appropriate; however, it is impossible to make a true determination of this without careful analysis of the Plan's experience.

After extensive review and analysis, we believe that the methods used by PERS staff to compute Plan costs and liabilities with respect to part time employees are well within reason and acceptable practice. Our recommendations are:

1. Add a brief explanation of the special valuation procedures and assumptions within the valuation report, and

2. Because part-time members represent a substantial segment of the Schools population, they should be analyzed separately in next experience study, to determine if any material difference in demographic experience is evident.

Tier 2 Dynamics for Miscellaneous and Industrial

Current Tier 2 members of the State Miscellaneous and State Industrial plans may transfer to Tier 1, provided that they either pay past employee contributions or accept an actuarially reduced retirement benefit.

Our understanding is that handling of active members is accomplished by the following process:

1. Project the hypothetical Tier 2 employee contribution balance to expected retirement;
2. Assume that all Tier 2 members will elect to join Tier 1 at retirement and take a higher benefit; and
3. Actuarially convert the hypothetical Tier 2 contribution balance into a lifetime deduction from the Tier 1 pension benefit.

We have reviewed this approach and found it to be reasonable and sufficiently conservative, and we created a valuation model which mimics the same methodology. As shown in Table 4 above, the normal cost for Tier 2 members we computed is the same as that computed by CalPERS.

Our only recommendation is to more fully describe this procedure within the valuation report.

Assumption Changes

Many of the valuation assumptions have been updated based on the recently completed "CalPERS Experience Study 1997 to 2007", published in April of 2010. EFI performed an initial review of this Report and provided a full report (dated April 19, 2010) under separate cover. A more detailed audit of this Experience Study is being planned.

In addition to the verification of the final valuation results, we evaluated the impact of the recent assumption changes on each plan. The impact of the new assumptions on Normal Cost, as reported in the State and Schools valuation was fairly small, ranging from a 2.1% relative decrease to a 6.4% relative increase. The impact on total Actuarial Accrued Liability ranged from 2.0% to 4.0% increase, relative.

For each plan, we computed the total Normal Cost and total Actuarial Accrued Liability based on old assumptions and compared them to our computations under the final (new) assumptions. We then compared the changes in Normal Cost and Actuarial Accrued Liability to those reported by CalPERS. We found all comparisons to be within reasonable tolerances. Table 6 below shows the impact on

Total Normal Cost and on Actuarial Accrued Liability for each of the plans, as computed by the CalPERS Actuarial Office, and separately by EFI.

Table 6: Comparison of Impact of Assumption Changes

	Relative Impact on Total Normal Cost			Relative Impact on Total Accrued Liability		
Plan	**CalPERS**	**EFI**	**Diff**	**CalPERS**	**EFI**	**Diff**
State Miscellaneous	-1.0%	-1.2%	-0.2%	2.8%	2.2%	+ 0.6%
State Industrial	-0.9%	-1.6%	-0.7%	2.8%	2.2%	- 0.6%
State Safety	6.4%	5.9%	-0.5%	4.0%	3.6%	- 0.4%
State Peace Officers & Firefighters	2.8%	2.7%	-0.1%	2.5%	2.7%	+ 0.2%
California Highway Patrol	2.5%	2.2%	-0.3%	2.0%	2.1%	+ 0.1%
County Schools Pool	-2.1%	-3.5%	-1.4%	2.0%	5.6%	+ 3.6%

For the five State systems, the difference between the EFI calculation of assumption impact is very close to that determined by CalPERS. The differences were slightly greater for the County Schools Pool valuation than for the State plans. This is likely caused by complications related to the part-time employee issue described above. EFI's Normal Cost impact is lower and our Actuarial Accrued Liability is higher, so the two offset each other in total contribution rates. Based on our analysis we believe that the reported impact of assumption changes on the Schools plan valuation is accurate.

Appendix 1: Demographic Data Comparison

	Active Participants						Retirees	
	Average Age		Average Service		Average Pay		Total Benefits* ($ millions)	
Plan	EFI	PERS	EFI	PERS	EFI	PERS	EFI	PERS
State Miscellaneous Tier 1	48.0	47.9	13.3	13.3	62,343	61,952	3,595.8	3,596.1
State Miscellaneous Tier 2	48.9	48.9	16.4	16.4	52,809	52,893	40.4	40.4
State Industrial	45.4	45.4	8.5	8.5	49,774	49,733	95.5	95.6
State Safety	47.4	47.4	6.7	6.7	74,216	74,278	253.6	253.8
State Peace Officers & Firefighters	41.2	41.2	11.0	11.0	71,717	71,706	942.9	942.6
California Highway Patrol	39.1	39.1	12.7	12.7	93,808	93,813	335.5	335.4
Schools	46.6	46.6	9.9	9.8	34,869	34,846	2,142.7	2,142.7

* Does not include PPPA amounts

Appendix 2: Liability Comparison

($ millions)

	Present Value of Future Benefits						Present Value of Future Salaries		
	Active Participants			Inactive Participants					
Plan	PERS	EFI	*Ratio*	PERS	EFI	*Ratio*	PERS	EFI	*Ratio*
State Miscellaneous	43,578	44,645	102.4%	42,226	41,463	98.2%	79,356	79,529	100.2%
State Industrial	1,844	1,755	95.2%	1,448	1,449	100.1%	4,910	4,842	98.6%
State Safety*	6,169	6,200	100.5%	2,942	2,902	98.6%	14,756	14,498	98.3%
State Peace Officers & Firefighters*	20,407	20,735	101.6%	13,838	13,575	98.1%	32,088	32,101	100.0%
California Highway Patrol	4,481	4,562	101.8%	4,420	4,417	99.9%	7,108	7,052	99.2%
Total State	**76,480**	**77,897**	**101.9%**	**64,873**	**63,805**	**98.4%**	**138,217**	**138,022**	**99.9%**
Schools	**28,996**	**27,981**	**96.5%**	**34,765**	**36,108**	**103.9%**	**82,129**	**80,978**	**98.6%**

* Reflects liability transfer of $356 million to the State POFF from the State Safety Plan